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Constraints faced by the MAUS-612 soybean variety growers & non-growers

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Abstract

This study evaluated the comparative constraints faced by growers and non-growers of the MAUS-612 soybean variety in the Marathwada region of Maharashtra, encompassing a sample size of 160 growers and 160 non-growers. Using Garrett's ranking technique, key challenges across personal, socio-economic, technical, agronomical, and marketing domains were analyzed. Among personal constraints, a knowledge gap in advanced cultivation practices was predominant, with mean scores of 51.86 for growers and 50.71 for non-growers. Lack of education (51.25 for growers, 51.04 for non-growers) and old age (49.81 for growers, 50.04 for non-growers) further limited modern farming adoption. Socio-economic constraints were more pronounced for non-growers, particularly high input costs (55.02 vs. 52.62 for growers), low income (54.64), and high labor wages (54.81). Credit unavailability was a significant issue, affecting non-growers (54.22) more than growers (51.93). Technical challenges, including non-availability of high-yielding seeds and fertilizers, were reported with scores of 55.19 for growers and 54.00 for non-growers. Agronomical issues, such as erratic rainfall and high pest incidence, along with marketing constraints like inadequate MSP (52.95 for non-growers, 51.67 for growers), highlighted the urgent need for improved extension services, input availability, and enhanced market infrastructure to support soybean production and marketing.

Keywords: Constraints, encompassing, Garrett's ranking, domains, credit unavailability

Introduction

Soybean (*Glycine max*. L. Merrill) is a leguminous crop and belongs to leguminaceae family. It is originated in China, it is a major oil seed crop in the world. Soybean is known as the "miracle crop", "wonder crop" etc, because of its several uses. Soybean contains 40 per cent proteins and 20 per cents oil. Soybean is the world's most important seed legume, which contributes to 25 per cent of the global edible oil. The present utilization pattern of soybean in India indicated that 85 per cent used for oil extraction, 10 per cent for seed and only 5 per cent for food and feed. Soybean has emerged as "golden bean" of 21st century and it is largely used as seed soybean is looked upon not merely as a means to supply food for humans and animals, but it improve the soil fertility by fix atmospheric nitrogen. About two thirds of the world's protein concentrate for livestock feeding is met from the de-oiled cake and it is a valuable ingredient in formulated feeds for poultry and fish. Apart from these two important uses of soybean, it also is an important commodity for the food manufacturers, pharmaceuticals and many more for its industrial uses.

Scenario of Soybean in World

According to Food and Agricultural Organization (FAO), total area under soybean cultivation during 2022-23 in globally was around 136.84 Million ha., production was around 378.06 Million MT. and productivity was around 2.76 MT/ha.

According to table 1 the five major soybean producing countries in the world are, Brazil (162.00 Million MT), USA (116.22 Million MT), Argentina (25.00 Million MT), China (20.28 Million MT) and India (12.41 Million MT).

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Table 1: Area, production and productivity of major soybean producing countries in world during 2022-23

Country	2022-23		
	Area (M. ha.)	Production (M. MT.)	Productivity (T/ha)
USA	34.87	116.22	3.33
Brazil	44.60	162.00	3.63
Argentina	14.40	25.00	1.74
China	10.24	20.28	1.98
India	13.08	12.41	0.95
World	136.84	378.06	2.76

Source: (AMIS, FAO)

Scenario of Soybean in India

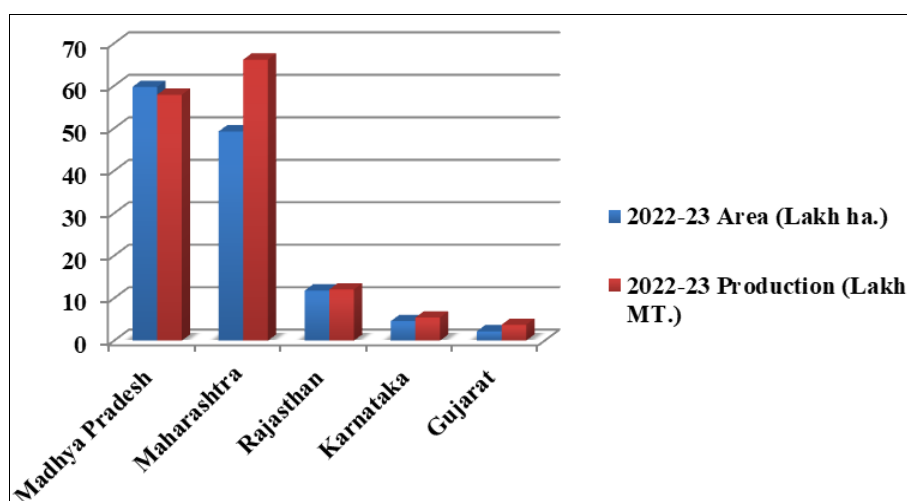
Out of total world soybean production countries, India's rank 5th in respect of production of soybean of the world with 12.41 Million MT. and rank 4th in total area with 13.08 Million ha. as per FAO.

In India five major soybean producing states are, Madhya Pradesh, Maharashtra, Rajasthan, Karnataka and Gujarat. Among all major soybean producing states according to table 2 Maharashtra rank 2nd in total area as well as production also with 49.26 Lakh ha. and 66.16 Lakh MT.

Table 2: Area, production and productivity of major soybean producing states in India during 2022-23

States	2022-23		
	Area (Lakh ha.)	Production (Lakh MT.)	Productivity (Kg/ha)
Madhya Pradesh	59.74	57.89	969
Maharashtra	49.26	66.16	1343
Rajasthan	11.80	12.07	1023
Karnataka	4.60	5.45	1184
Gujarat	2.22	3.73	1682

Source: (DAC & FW)

**Fig 1:** Area, production and productivity of soybean in Maharashtra's five major states during 2022-23**Scenario of Soybean in Marathwada Region**

The table 3 indicated that total area under soybean cultivation in Marathwada region was around 24.87 Lakh ha. and production is around 33.05 Lakh MT.

In Marathwada Region total 8 districts are present i.e. Aurangabad, Jalna, Beed, Latur, Osmanabad, Nanded, Parbhani and Hingoli. Out of this total 8 districts Latur district rank 1st in total area as well as production also with 4.89 Lakh ha. & 5.39 Lakh MT.

Table 3: District-wise Area, production and productivity of soybean in Marathwada region during 2022-23

Division / District	2022-23		
	Area (Lakh ha.)	Production (Lakh MT.)	Productivity (Kg/ha)
Latur	4.89	5.39	1102
Osmanabad	4.46	5.05	1130
Parbhani	2.69	4.21	1562
Hingoli	2.57	4.08	1588
Nanded	4.47	5.33	1192
Aurangabad	0.30	0.23	779
Jalna	2.00	3.48	1736
Beed	3.44	5.24	1557
Total	24.87	33.05	2603

Source: (<http://krishi.maharashtra.gov.in>)**Scope of Soybean Cultivation in Agricultural Economics**

Soybean farming holds diverse applications within agricultural

economics, encompassing production, marketing, trade, policy, and sustainability. Agricultural economists assess the profitability and risk factors of soybean cultivation through economic feasibility studies, analyzing input costs, output prices, and yield potential. Cost-benefit analyses and financial modeling techniques are employed to optimize resource allocation, considering variables such as land, labor, machinery, fertilizers, pesticides, and other inputs. Market dynamics and pricing trends in the soybean sector are investigated to understand supply-demand factors, price volatility, market integration, and price transmission across channels and regions. This market analysis supports stakeholders, including farmers, traders, processors, and policymakers, in making informed decisions about production, storage, transportation, and marketing strategies to enhance profitability and mitigate risks. The global trade of soybeans is a critical focus area, involving studies of import-export patterns, tariffs, quotas, and trade agreements to evaluate trade policy impacts on competitiveness, market access, and geopolitical influences.

Agricultural economists also examine the socioeconomic implications of soybean farming, including its effects on rural livelihoods, employment, income distribution, poverty alleviation, and food security. Policy analysis evaluates the effectiveness of regulations, subsidies, and incentives on trade, production, and environmental sustainability. Moreover, sustainability assessments analyze the environmental, social, and economic dimensions of soybean farming, emphasizing the

trade-offs between financial gains and long-term benefits like soil health, water quality, biodiversity, and climate change mitigation. Interdisciplinary research and stakeholder collaboration are essential to address complex challenges and foster sustainable development in the soybean value chain.

Materials and Methods

The primary data was collected for the study pertaining to agriculture year 2022-23. The data was collected through personal interview method with the help of pre-tested comprehensive schedule for soybean crop from sample farmers. Secondary data needed for the study that is year wise and district wise for area, production and productivity was obtained from different sources viz. Directorate of Statistics and Evaluation, Websites of Government of Maharashtra and AICRP Soybean Research Station, VNMKV Parbhani.

• Constraints Analysis Garrett's ranking technique

Garrett's ranking technique was used to study the opinions of the farmers regarding the major constraints associated with production and marketing of soybean. As per this method, respondents were asked to assign the rank for all factors and the outcomes of such ranking was converted into Garrett score value with the help of the following formula:

$$\text{Percent position} = \frac{100(R_{ij} - 0.5)}{N_j}$$

$$\text{Percent position} = \frac{100(R_{ij} - 0.5)}{N_j}$$

Where,

R_{ij} = Rank given for the i th variable by j th respondents and

N_j = Number of variable ranked by j th respondents

The per cent position is converted into scores by referring to the table given by Garrett and Woodworth (1969). Then for each factor, the scores of each individual were added and then total value of scores and mean values of score were calculated. These mean scores for all the factors were arranged in descending order and the most influencing factors were identified through the ranks assigned. The factors having highest mean value were considered to be the most important factor.

• The Per cent Positions and Garrett Values

The Garrett ranks were calculated by using appropriate Garrett Ranking formula, based on the Garrett ranks, the Garrett value was calculated. The Garrett tables and scores of each constraint multiplied to records scores, finally by adding each row, the total Garrett scores were obtained.

Results and Discussion

The table 4 analyzed the constraints faced by growers and non-growers of the MAUS-612 soybean variety, highlighting personal, socio-economic, communication, technical, agronomical, and marketing challenges. Statistical rankings based on mean scores provided insight into the relative severity

of these issues for each group.

- 1. Personal Constraints:** Among personal constraints, "Lack of Knowledge" ranked highest for growers (mean score 51.86) and second for non-growers (50.71). Conversely, "Lack of Education" was the primary constraint for non-growers (51.04), reflecting their limited access to advanced information and practices, while it ranked second for growers (51.25). Other constraints, such as "Old Age" (mean score 49.81 for growers, 50.04 for non-growers) and "Lack of Risk Bearing Capacity" (49.55 for growers, 50.43 for non-growers), were moderate but significant. The challenge of balancing "Other Business" engagements was ranked lowest among both groups.
- 2. Socio-economic Constraints:** Socio-economic challenges were prominent, particularly "High Cost of Inputs," which was the most critical issue for both growers (52.62) and non-growers (55.02). "High Rates of Labour Wages" (52.10 for growers, 54.81 for non-growers) and "Credit Non-Availability at Proper Time" (51.93 for growers, 54.22 for non-growers) further underscored financial limitations. Interestingly, "Small Land Holdings" posed a higher rank among growers (51.26, rank IV) than non-growers (45.75, rank V), reflecting growers' greater sensitivity to land size in achieving economic viability.
- 3. Technical Constraints:** The most pressing technical issue was the "Non-Availability of Inputs (HYV seeds, fertilizers, equipment, etc.) at Proper Time," with growers and non-growers assigning high mean scores (55.19 and 54.00, respectively). This indicates a critical bottleneck in resource accessibility. "Unavailability of Proper Electric Supply" (48.00 for growers, 52.75 for non-growers) and "Lack of Irrigation Facility" (47.81 for growers, 44.25 for non-growers) further limited operational efficiency.
- 4. Agronomical Constraints:** Among agronomical challenges, "Lack of Knowledge About Management Practices" was paramount for both groups, with the highest mean scores (52.66 for growers, 55.03 for non-growers). "High Incidence of Pests" (50.75 growers, 52.44 non-growers) and "High Incidence of Fungal Disease" (50.39 growers, 51.53 non-growers) were also significant, underscoring the need for improved pest and disease management strategies.
- 5. Marketing Constraints:** Marketing barriers were particularly acute, with "MSP is not Adequate" receiving the highest ranks (51.67 for growers, 52.95 for non-growers), indicating dissatisfaction with minimum support prices. Issues such as "Low Price at Time of Harvesting" (51.25 growers, 52.79 non-growers) and "Lack of Storage Facility" (50.26 growers, 50.09 non-growers) highlighted the need for better infrastructure and timely payment mechanisms.

This detailed analysis reflects the multifaceted challenges encountered by MAUS-612 soybean growers and non-growers, emphasizing the necessity of targeted interventions in education, resource accessibility, financial support, and market infrastructure to alleviate these constraints effectively.

Table 4: Constraints faced by the MAUS-612 soybean variety growers & non-growers

Sr. No.	Constraints	Growers		Non – Growers	
		Mean Score	Rank	Mean Score	Rank
Personal Constraints					
1	Lack of Education	51.25	II	51.04	I
2	Lack of Knowledge	51.86	I	50.71	II
3	Old Age	49.81	III	50.04	IV
4	Lack Of risk bearing Capacity	49.55	IV	50.43	III
5	Other business	49.54	V	49.78	V
Socio-economic Constraints					
1	Small land holdings	51.26	IV	45.75	V
2	High Cost input	52.62	I	55.02	I
3	Low income	48.79	V	54.64	III
4	Credit non availability at proper time	51.93	III	54.22	IV
5	High rates of labour wages	52.10	II	54.81	II
6	Lack of social motivation	48.09	VII	43.86	VII
7	Other people not adopt advanced technology	48.22	VI	44.7	VI
Communication Constraints					
1	Lack of adequate information at proper time and amount	52.75	II	47.31	II
2	Lack of awareness regarding information	44.25	III	47.31	III
3	Training of soybean package practices	54.00	I	54.56	I
Technical Constraints					
1	Lack of irrigation Facility	47.81	III	44.25	III
2	Unavailability of proper electric supply	48	II	52.75	II
3	Non availability of inputs (HYV, seed, fertilizers, equipment’s etc.) at proper time in village or nearby village	55.19	I	54.00	I
Agronomical Constraints					
1	Crop damage due to erratic rainfall	49.41	IV	50.39	IV
2	High incidence of pest	50.75	II	52.44	II
3	poor fertility of soil	48.80	V	42.61	V
4	High incidence of fungal disease	50.39	III	51.53	III
5	lack of knowledge about management practices	52.66	I	55.03	I
Marketing Constraints					
1	Lack of transportation	49.37	VII	49.09	VII
2	MSP is not Adequate	51.67	I	52.95	I
3	Low price at time of harvesting	51.25	II	52.79	II
4	lack of prompt payment after sell	50.22	IV	49.46	IV
5	low infrastructure facilities in market	50.15	V	49.43	V
6	Non availability of market	50.09	VI	49.19	VI
7	lack of storage facility	50.26	III	50.09	III

Conclusion

The analysis of constraints faced by MAUS-612 soybean growers and non-growers reveals a complex interplay of personal, socio-economic, technical, agronomical, and marketing challenges. Among personal constraints, lack of knowledge and education emerged as the most critical issues, emphasizing the need for enhanced awareness and capacity-building initiatives. Socio-economic constraints, such as high input costs and limited credit availability, further highlight financial barriers that affect both groups significantly.

Technical challenges, particularly the unavailability of critical inputs and inadequate infrastructure for irrigation and electricity, indicate systemic shortcomings in resource distribution and accessibility. Agronomical constraints, including the lack of knowledge about management practices and high incidences of pests and diseases, underscore the necessity for targeted training and support in modern agricultural techniques. Lastly, marketing constraints, especially inadequate MSP and low prices at the time of harvest, point to the pressing need for improved market policies, infrastructure, and timely payment mechanisms.

Overall, the study underscores the importance of an integrated approach to addressing these constraints. Interventions should focus on providing better education and training, ensuring timely access to resources, enhancing financial support mechanisms, and creating a robust marketing infrastructure. By tackling these

issues holistically, the productivity and profitability of MAUS-612 soybean cultivation can be significantly improved, benefiting both growers and non-growers alike.

Policy Implications

1. Strengthening Education and Awareness Programs

- Implement targeted training initiatives to address knowledge gaps among growers and non-growers, focusing on modern soybean cultivation practices, pest management, and efficient use of resources.
- Enhance access to extension services and digital platforms for timely dissemination of agricultural information.

2. Improving Access to Financial Resources

- Expand credit schemes tailored for smallholder farmers, ensuring timely availability of funds for purchasing inputs and managing operational costs.
- Provide subsidies or financial incentives for high-cost inputs like seeds, fertilizers, and pest control measures to reduce the financial burden on farmers.

3. Developing Infrastructure for Resource and Market Accessibility

- Invest in rural infrastructure, including irrigation systems,

reliable electricity supply, and village-level input centers, to ensure the availability of critical resources.

- Build storage facilities and improve transportation networks to mitigate post-harvest losses and enhance market access.
- 4. Market Reforms to Improve Farmer Profitability**
- Revise and enhance the Minimum Support Price (MSP) system to align with market trends and production costs, ensuring fair returns for soybean growers.
 - Establish efficient and transparent payment systems to provide prompt remuneration for farmers post-sale.
- 5. Fostering Research and Technology Adoption**
- Promote research into pest-resistant and climate-resilient soybean varieties to address agronomical constraints like pest outbreaks and erratic rainfall.
 - Encourage adoption of advanced farming technologies through government-supported demonstration programs and farmer cooperatives.

These policies aim to address the root causes of the challenges identified, improving productivity, profitability, and sustainability for MAUS-612 soybean growers and non-growers alike.

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